05 Oct 2024 Live Classes Schedule

| 8:00AM | — | 05 OCTOBER 2024 DAILY CURRENT AFFAIRS | RUBY MA'AM |
| 9:00AM | — | 05 OCTOBER 2024 DAILY DEFENCE UPDATES | DIVYANSHU SIR |

NDA 1 2025 LIVE CLASSES

| 11:30AM | — | GK : INDIAN GEOGRAPHY CLASS 2 | RUBY MA'AM |
| 4:00PM | — | MATHS : SETS, RELATION AND FUNCTION - 3 | NAVJYOTI SIR |

CDS 1 2025 LIVE CLASSES

| 11:30AM | — | GK : INDIAN GEOGRAPHY CLASS 2 | RUBY MA'AM |
| 2:30PM | — | MATHS : TIME & WORK - CLASS 1 | NAVJYOTI SIR |

AFCAT 1 2025 LIVE CLASSES

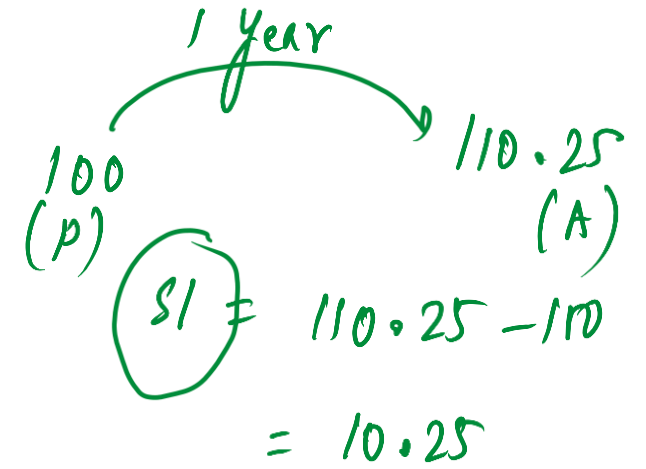| 10:00AM | — | REASONING : DIRECTION AND DISTANCES | RUBY MA'AM |
| 2:30PM | — | MATHS : TIME & WORK - CLASS 1 | NAVJYOTI SIR |

SSBCrack EXAMS

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Q) An automobile financier claims to be lending money at simple interest, but he includes the interest every six months for calculating the principal. If he is charging an interest of 10%, the effective rate of interest becomes :

(a)   10%   (b)   10.25%

(c)   10.5%   (d)   None of these

P

SI for next 6 months,

$$\frac{\frac{21P}{20} \times 10 \times \frac{1}{2}}{100_{10}} = \boxed{\frac{21P}{400}}$$

SI for first 6 months,

$$SI = \frac{P \times 10 \times \frac{1}{2}}{100_{10}} = \boxed{\frac{P}{20}}$$

Total SI for 1 year

$$\frac{P}{20} + \frac{21P}{400} = \frac{20P + 21P}{400} = \frac{41P}{400}$$

new $P = P + \frac{P}{20} = \left(\frac{21P}{20}\right)$

$$\frac{41\cancel{\rlap{/}}}{\cancel{400}\atop 4} = \frac{\cancel{P} \times r_{eff} \times \cancel{1}}{100}$$

$$r_{eff} = \frac{41}{4} = \underset{\sim\sim\sim}{10.25\%}$$

(OR)

$$\underline{100} \quad\curvearrowright\quad \text{Amount after } 6 \text{ months} \rightarrow 100 + \frac{10}{2} = \underline{105}$$

Next 6 months $\longrightarrow$ Amount $= 105 + \dfrac{10.5}{2}$

$$= 105 + 5.25$$

$$= \underline{110.25}$$

1 Year

$$100 \xrightarrow{\hspace{2cm}} 110.25$$

$$(P) \qquad\qquad (A)$$

$$\boxed{SI} = 110.25 - 100$$

$$= \underline{10.25}$$

$$r\% = 10.25\%$$

$$SI = \frac{100 \times r \times 1}{100}$$

Q) An automobile financier claims to be lending money at simple interest, but he includes the interest every six months for calculating the principal. If he is charging an interest of 10%, the effective rate of interest becomes :

(a) 10%   (b) 10.25%
(c) 10.5%   (d) None of these

Ans: (b)

Q) A man borrowed some money and agreed to pay-off by paying ₹ 3150 at the end of the 1st year and ₹ 4410 at the end of the 2nd year. If the rate of compound interest is 5% per annum, then the sum is

(a) ₹5000   (b) ₹6500   (c) ₹7000   (d) ₹9200 ✓

$$P\left(1 + \frac{r}{100}\right)^{n} = A$$

present value   Future value

↓   after n years

back date value   present value

$$P = \text{Value of } ₹ 3150 + \text{Value of } ₹ 4410$$

1 year ago   2 years ago

$$= \frac{3150}{\left(1 + \frac{5}{100}\right)^{1}} + \frac{4410}{\left(1 + \frac{5}{100}\right)^{2}} = \frac{3150 \times 20}{21} + \frac{4410 \times 20 \times 20}{21 \times 21}$$

$$= \underline{3000} + \underline{4000}$$

$$= 7000\text{/}$$
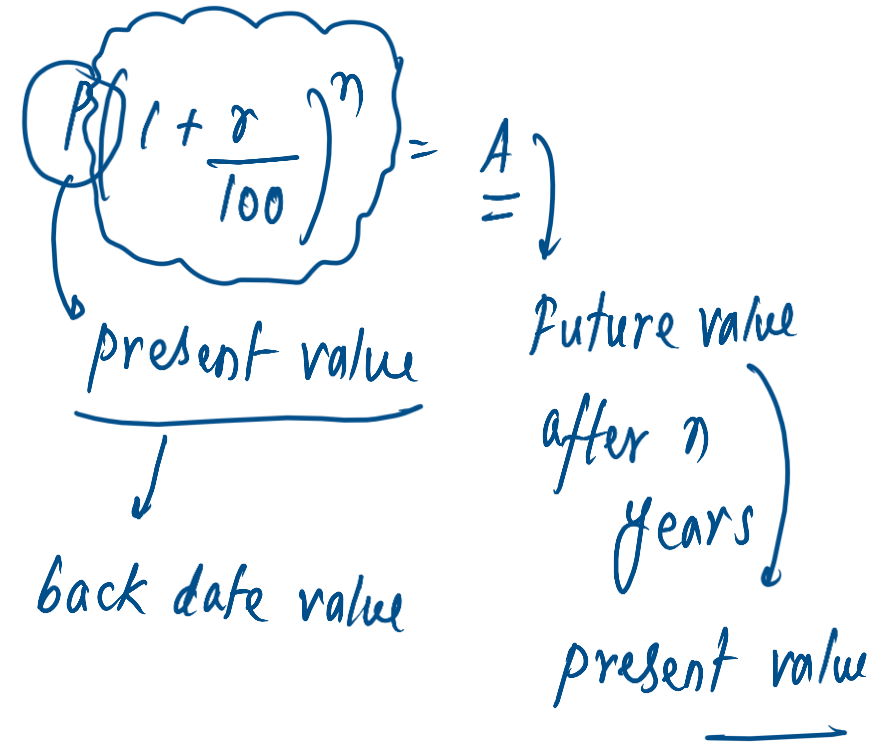
Q) A man borrowed some money and agreed to pay-off by paying ₹ 3150 at the end of the 1st year and ₹ 4410 at the end of the 2nd year. If the rate of compound interest is 5% per annum, then the sum is

(a) ₹ 5000   (b) ₹ 6500   (c) ₹ 7000   (d) ₹ 9200

Ans: (c)

EFFICIENCY CONCEPT

- **Efficiency** – 'How much work one person can do in one day is defined as its efficiency'.

For example: If person completes a work in 2 days, efficiency of person will be $\frac{1}{2}$.

$$\text{Work done in 1 day} = \frac{1}{2}$$

n days are required to complete a task/work,

$$\text{Work done in 1 day} = \frac{1}{n},$$

EFFICIENCY CONCEPT

- Work done by person = Efficiency of person × Time given by person in work

$$W = E \times T$$

- Efficiency of person is inversely proportional to time taken to complete work.

$$\left(E \propto \frac{1}{T} \right)$$

IMPORTANT CONCEPTS

- It is important to remember $W = E \times T$

- Therefore, $E \alpha \dfrac{1}{T}$
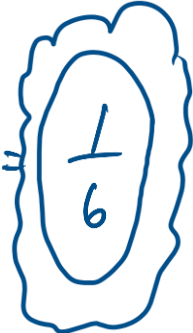
EXAMPLE

A can finish a work in 18 days and B can do the same work in half the time taken by A. Then, working together, what part of the same work they can finish in a day?

(a) $\dfrac{1}{6}$ (b) $\dfrac{1}{9}$ (c) $\dfrac{2}{5}$ (d) $\dfrac{2}{7}$

A's 1 day work $= \dfrac{1}{18}$

B " " " $= \dfrac{1}{9}$

$(A+B)$'s 1 day work $= \dfrac{1}{18} + \dfrac{1}{9} = \dfrac{1+2}{18} = \dfrac{3}{18} = \dfrac{1}{6}$

EXAMPLE

A can do a piece of work in 25 days and B in 20 days. They work together for 5 days and then A goes away. In how many days will B finish the remaining work?

(a) 17 days   (b) 11 days

(c) 10 days   (d) None of these

A's 1 day work $= \dfrac{1}{25}$

B " " " $= \dfrac{1}{20}$

$(A+B)$'s 1 " " $= \dfrac{1}{25} + \dfrac{1}{20} = \dfrac{4+5}{100} = \dfrac{9}{100}$

Work done in 5 days $= \dfrac{9}{100} \times 5 = \boxed{\dfrac{9}{20}}$

Remaining work $= 1 - \dfrac{9}{20} = \dfrac{11}{20}$

B will finish in,

$\dfrac{\frac{11}{20}}{\left(\frac{1}{20}\right)} = 11\ days$

eff. A (one day work)

$25 \quad (4) \left(\dfrac{100}{25}\right)$

(100) units — work

20

(5)

eff. (B) $\left(\dfrac{100}{20}\right)$

(one day work)

1 day eff together

$= 4 + 5 = 9$

5 days $\longrightarrow 9 \times 5 = (45)$

Rem. $= 100 - 45 = (55)$

B's days to $= \dfrac{55}{5} = 11$ days

complete remaining
work

EXAMPLE

A can do a piece of work in 25 days and B in 20 days. They work together for 5 days and then A goes away. In how many days will B finish the remaining work ?

(a)   17 days   (b)   11 days
(c)   10 days   (d)   None of these

Ans: (b)

EXAMPLE

A and B together can do a piece of work in 6 days. If A can alone do the work in 18 days, then the number of days required for B to finish the work is x days

(a) 12   (b) 9   (c) 15   (d) 10

$(A+B)$'s 1 day work $= \dfrac{1}{6}$

A's " " $= \dfrac{1}{18}$

$\dfrac{1}{18} + \dfrac{1}{x} = \dfrac{1}{6}$

$\dfrac{1}{x} = \dfrac{1}{6} - \dfrac{1}{18} = \dfrac{3-1}{18} = \dfrac{2}{18}$

$\dfrac{1}{x} = \dfrac{2}{18}$

$\dfrac{x}{1} = \dfrac{18}{2} \Rightarrow x = 9 \text{ days}$

EXAMPLE

A and B together can do a piece of work in 6 days. If A can alone do the work in 18 days, then the number of days required for B to finish the work is

(a) 12   (b) 9   (c) 15   (d) 10

Ans: (b)

Q) A, B and C can do a peice of work individually in 8, 10 and 15 days, respectively. A and B start working but A quits after working for 2 days. After this, C joins B till the completion of work. In how many days will the work be completed?

(a)   53/9 days   (b)   34/7 days
(c)   85/13 days   (d)   53/10 days

$$A \rightarrow \frac{1}{8} \qquad B \rightarrow \frac{1}{10} \qquad C \rightarrow \frac{1}{15}$$

$$\left(\frac{1}{8} + \frac{1}{10}\right) \times 2 = \frac{18}{80} \times 2 = \frac{18}{40} = \frac{9}{20}$$
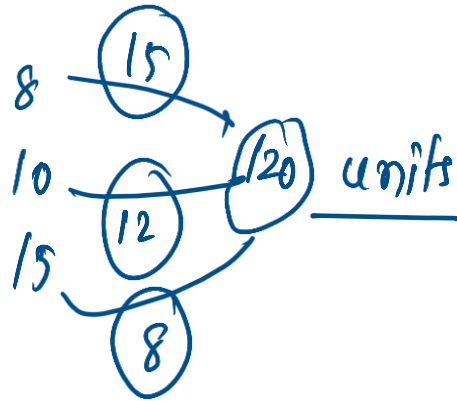
$$\text{Remaining work} = \frac{11}{20}\left(1 - \frac{9}{20}\right)$$

$$\frac{11}{20}$$
$$\overline{\left(\frac{1}{10} + \frac{1}{15}\right)} \searrow \frac{3+2}{30}$$

$$\frac{11}{\overset{2}{\cancel{20}}} \times \overset{3}{\cancel{6}} = \frac{33}{10}$$

Q) A, B and C can do a peice of work individually in 8, 10 and 15 days, respectively. A and B start working but A quits after working for 2 days. After this, C joins B till the completion of work. In how many days will the work be completed?

(a) 53/9 days

(b) 34/7 days

(c) 85/13 days

(d) 53/10 days

$$27 \times 2 = 54$$

$$120 - 54 = 66$$

$$\frac{66}{20} = \frac{33}{10}$$

8 — (15)

10 — (12) — (120) units

15 — (8)

Ans: (d) — (wrong options — correct answer is $\frac{33}{10}$)

PIPE AND CISTERN

- The same principle of Time and Work is implied to solve the problems on Pipes and Cisterns. The only difference is that in this case, the work done is in terms of filling or emptying a cistern (tank) and the time taken is the time taken by a pipe or a leak (crack) to fill or empty a cistern, respectively.

- **Inlet Pipe:** A pipe connected with a tank is called an inlet, if it fills it. It has positive efficiency.

- **Outlet Pipe:** A pipe connected with a tank is called an outlet, if it empties it. It has negative efficiency.
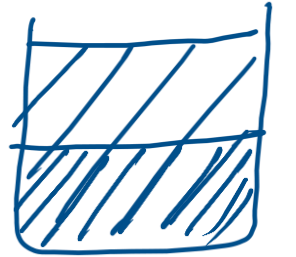
A pipe fills in 'n' hours.

→ Volume filled/emptied in 1 hours,

$$= \left(\frac{1}{n}\right)$$

2 hours

1 hr.

EXAMPLE

Pipe A can fill an empty tank in 6 hours and pipe B in 8 hours. If both the pipes are opened and after 2 hours pipe A is closed, how much time B will take to fill the remaining tank?

(a) $2\dfrac{2}{5}$ hours

(b) $7\dfrac{1}{2}$ hours

(c) $2\dfrac{1}{3}$ hours

(d) $3\dfrac{1}{3}$ hours

for 2 hours $= \dfrac{7}{24} \times 2 = \dfrac{7}{12}$

Rem. vol. $= 1 - \dfrac{7}{12} = \boxed{\dfrac{5}{12}}$

$= \dfrac{5}{12}$

A fills in 1 hour $\longrightarrow \dfrac{1}{6}$

B   "   "   " $\longrightarrow \boxed{\dfrac{1}{8}}$ ✓

$\dfrac{\frac{5}{12}}{\frac{1}{8}} = \dfrac{5 \times 8^{2}}{12_{3}}$

$(A+B)$ "   " " $= \dfrac{1}{6} + \dfrac{1}{8} = \dfrac{14}{48} = \dfrac{7}{24}$

$= \dfrac{10}{3} = 3\dfrac{1}{3}$ hours

EXAMPLE

Pipe A can fill an empty tank in 6 hours and pipe B in 8 hours. If both the pipes are opened and after 2 hours pipe A is closed, how much time B will take to fill the remaining tank?

(a) $2\dfrac{2}{5}$ hours

(b) $7\dfrac{1}{2}$ hours

(c) $2\dfrac{1}{3}$ hours

(d) $3\dfrac{1}{3}$ hours

Ans: (d)

COMPARISON SITUATION

- First case:

Second case:

M1 = No. of Men

M2 = No. of men

D1 = No. of Days worked for

D2 = No. of Days worked for

T1 = Time worked for

T2 = Time worked for

E1 = Efficiency of workers

E2 = Efficiency of workers

W1 = Work done

W2 = Work done

S1 = Salary/wages

S2 = Salary/wages

$$\frac{M1 \times D1 \times T1 \times E1}{W1 \times S1} = \frac{M2 \times D2 \times T2 \times E2}{W2 \times S2}$$

EXAMPLE

If 10 persons can dig 8 ft trench in 12 days, then how many days will 8 persons take to dig 6 ft trench?

(a) 10 days   (b) 10.25 days

(c) 11 days   (d) 11.25 days

$$\frac{\text{no. of men} \times \text{no. of days}}{\text{Work}}$$

$$\frac{10 \times 12}{8} = \frac{8 \times d}{6}$$

$$d = \frac{10 \times 12 \times 6}{8 \times 8} = \frac{45}{4} = 11.25 \text{ days}$$

EXAMPLE

If 10 persons can dig 8 ft trench in 12 days, then how many days will 8 persons take to dig 6 ft trench?

(a) 10 days

(b) 10.25 days

(c) 11 days

(d) 11.25 days

Ans: (d)

Q) How many men will be required to plough 100 acres of land in 10 days, if 10 men require 8 days to plough 20 acres of land?

(a)   30   (b)   40
(c)   50   (d)   60

$$\frac{10 \times m}{100_{10}} = \frac{\overset{5}{10} \times 8}{\cancel{20}}$$

$$m = 40$$

Q) How many men will be required to plough 100 acres of land in 10 days, if 10 men require 8 days to plough 20 acres of land?

(a) 30

(b) 40

(c) 50

(d) 60

Ans: (b)

Q) $\dfrac{1}{48}$ of a work is completed in half a day by 5 persons.

Then, $\dfrac{1}{40}$ of the work can be completed by 6 persons in how many days?

(a)   1

(b)   2

(c)   3

(d) $\dfrac{1}{2}$

Q) $\dfrac{1}{48}$ of a work is completed in half a day by 5 persons.

Then, $\dfrac{1}{40}$ of the work can be completed by 6 persons in how many days?

(a) 1

(b) 2

(c) 3

(d) $\dfrac{1}{2}$

Ans: (d)